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SUBJECT: Recording Techniques

1. Introduction: Methods of recording are dependent upon both the recorder and the recording simultaneously. To group each method under specific techniques is difficult and, hence, there is overlapping. No attempt has been made to evaluate techniques discussed.

2. Discussion:

a. Electric Spark: A spark is discharged from a point source through the recording to a metallic drum, either puncturing or charring the paper. Intensity variations will primarily be indicated by the length of puncture as the intensity of discharge is constant. Voids can be introduced into transparent hygroscopic plastic sheets altering their reflectivity and refractivity by spark discharge. The chemical composition remains unaltered.

b. Electrostatic: A point source induces or throws charge on a dielectric. The primary advantage of the technique over magnetic recording is that resolution is increased as there are no cyclic changes about a zero. Leakage, however, limits the permanency of the recording. Electrostatics can also be used to expose film with as good a resolution as if exposed to light.

c. Radioactive: Radiation of constant intensity exposes film through an aperture. Intensity variations on the film vary with length of exposure.

d. Electron-beam: A cathode ray tube with its beam focused on film is the recorder. Each tube contains its own film, thus making the device one-shot. Even though focusing might require low power, the problem of obtaining a long sweep period might require excessive apparatus and power. Difficulties in focusing the beam might be reduced with low intensity beams in small tubes.

e. Magnetic: A magnetic field is induced in either wire or tape. Even though resolution of the wire might be near ideal, the resolution of the recorder is limited due to cyclic operation and head resolution.

f. Electrochemical:

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f. Electrochemical: This method can be either:

- (1) Etching by gases or liquid;
- (2) Electrolytic marking by a point discharge;
- (3) The formation of minute gas bubbles by breaking bonds in the recording due to a point discharge;
- (4) Other chemical changes resulting either in voids or color changes in the recording.

g. Photographic: Film is exposed by electromagnetic waves. Recorders are primarily optical systems of high resolving power. Hair lines moved electrically can be projected on film.

h. Recording discs: These are standard wax recordings, either cylindrical or circular discs.

i. Pyrotechniques: This method is the application of heat to a sensitive. This may be done by gases, filaments, discharges, radiation, etc. Paper carrying a sensitive powder or colloid formation is generally used for recording. Metal can be vaporized on or off of paper, changing its conductivity. Also, the moisture content of the paper can be varied.

j. Ultrasonic compression: Ultrasonic waves alter the physical properties of the recording. This technique appears to be rather new, and limiting sensitivity and resolution of recording materials is not known.

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